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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/282,772	03/31/1999	SEIJI TANUMA	0941.63006	9077
24978 7590 11/17/2003 GREER, BURNS & CRAIN 300 S WACKER DR 25TH FLOOR CHICAGO, IL 60606			EXAMINER QI, ZHI QIANG	
			ART UNIT 2871	PAPER NUMBER

DATE MAILED: 11/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary****Application No.**

09/282,772

**Applicant(s)**

TANUMA ET AL.

**Examiner**

Mike Qi

**Art Unit**

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 4-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1 and 6 is/are allowed.
- 6) ☒ Claim(s) 4 and 5 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 10/6/03.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant admitted prior art (AAPA) in view of US 6,180,026 (Rieger et al).

Claim 4, AAPA discloses (page 1, line 5 – page 3, line 32; Figs. 2A, 2B) that a conventional liquid crystal display device comprising:

- a first substrate (10);
- a second substrate (12) facing the first substrate;
- a liquid crystal layer (140) interposed between the first and second substrates(10, 12);
- a group of electrodes, such as electrodes (11a, 11b), disposed on the first substrate (10) so as to create an electric field in the liquid crystal layer general parallel to the first substrate in an activated state in which a drive voltage is applied to the electrodes;
- when the drive voltage is not applied to the electrodes (11a, 11b) (in a non-activated state), the liquid crystal molecules (16) are aligned generally perpendicular to the plane of the first substrate (10);

- when the drive voltage is applied to the electrodes (11a, 11b) (in a activated state), the liquid crystal molecules are aligned generally parallel to the plane of the first substrate, i.e., aligned in the direction of the electric field inside the liquid crystal layer in the activated state (see Fig.2B for the symmetrical middle area).

AAPA does not expressly disclose that the liquid crystal layer having a birefringence larger than about 0.10 but smaller than about 0.25.

However, Rieger discloses (col.3, line 27 – col.4, line 29) that a liquid crystal having a birefringence  $\Delta n$  of at least 0.12 so as to allow short switching times, and the birefringence  $\Delta n$  is preferred of 0.13 to 0.18, that is a range within the range of 0.10 to 0.25, and Rieger indicates (col.4, lines 23-24) that such liquid crystal shows a reduced viscosity and allow short switching times so as to reduce the switching time and increase the response speed.

Since Rieger indicates the liquid crystal material using such birefringence range would reduce the switching time so as to increase the response speed, such that those skilled in the art would use such birefringence range to develop a liquid crystal device in vertical alignment mode device for increasing the response speed.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use a liquid crystal layer having a birefringence which is about 0.1 to 0.25 as claimed in claim 4 for achieving a short switching times so as to increase the response speed.

3. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA and Rieger as applied to claim 4 above, and further in view of US 5,374,374 (Weber et al).

Claim 5, Weber discloses (col.12, line 45-51) that the liquid crystal mixtures contain tolan compound, so as to allow using smaller layer thickness and giving significantly shorter response times.

Therefore, it would have been obvious to those skilled in the art at time the invention was made to use a liquid crystal layer contain a tolan-family compound as claimed in claim 5 for achieving a shorter response times so as to increase the response speed.

***Allowable Subject Matter***

4. Claims 1 and 6 are allowed.

5. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record neither discloses nor teaches a liquid crystal display device comprising various elements as claimed, more specifically, as the following:

the first and second electrodes being provided outside a display area in which transmission of an optical beam is turned on and off; and a first projection provided on the first electrode, a second projection provided on the second electrode, the first and second projections inducing the pre-tilt angle in the liquid crystal molecules located adjacent to the first and second projections; so that forming a first region in the

molecular alignment film in correspondence to the first electrode and a second region in the molecular alignment film in correspondence to the second electrode by ultraviolet irradiation and inducing the pre-tilt angle in the liquid crystal molecules adjacent to the first and second regions [claims 1 and 6].

The closest references AAPA, US 5,907,380 (Lien), US 6,177,973 (Lee et al) and US 6,344,883 (Yamada et al) disclose a structure of a liquid crystal display device in which two projections (or convex portions) are provided on the different electrodes in order to improve the response speed and the viewing angle for a vertical alignment mode display, but the references do not teach the two difference electrodes being provided outside of the display area and inducing a pre-tilt angle in the two projections as claimed in the claims 1 and 6 and such as shown of the Fig.5.

### ***Response to Arguments***

6. Applicant's arguments, see Remarks, filed on September 26, 2003, with respect to the claims 1 and 6 have been fully considered and are persuasive. The rejection of claims 1 and 6 has been withdrawn.

7. Applicant's arguments filed on September 26, 2003 with respect to the claims 4-5 have been fully considered but they are not persuasive.

#### **Applicant's only arguments concerning the claim 4 are as follows:**

1) The reference Rieger does not teach or suggest a vertical alignment liquid crystal having negative dielectric anisotropy, so that the reference Rieger cannot be combined.

Examiner's responses to Applicant's **only** arguments are as follows:

1) The reference Rieger is a secondary reference to teach a liquid crystal having a birefringence  $\Delta n$  of at least 0.12 so as to allow short switching times, and the birefringence  $\Delta n$  is preferred of 0.13 to 0.18, that is a range within the range of 0.10 to 0.25, and Rieger indicates (col.4, lines 23-24) that such liquid crystal shows a reduced viscosity and allow short switching times so as to reduce the switching time and increase the response speed, such that those skilled in the art would use such birefringence range to develop a liquid crystal device in vertical alignment mode device for increasing the response speed.

***Conclusion***

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


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9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (703) 308-6213.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Mike Qi  
November 5, 2003



TOANTON  
PRIMARY EXAMINER